

are provided to relieve the stresses resulting from the expansion of the exhaust piping.

(g) A dry exhaust pipe must:

(1) If it passes through a combustible bulkhead or partition, be kept clear of, and suitably insulated or shielded from, combustible material.

(2) Be provided with noncombustible hangers and blocks for support.

(h) An exhaust pipe discharge terminating in a transom must be located as far outboard as practicable so that exhaust gases cannot reenter the vessel.

(i) Arrangements must be made to provide access to allow complete inspection of the exhaust piping throughout its length.

(j) An exhaust installation subject to pressures in excess of 105 kPa (15 psig) or having exhaust pipes passing through living or working spaces must meet the material requirements of part 56 of subchapter F (Marine Engineering) of this chapter.

(k) Engine exhaust installations built in accordance with the requirements of ABYC P-1 will be considered as meeting the requirements of this section.

[CGD 85-080, 61 FR 922, Jan. 10, 1996, as amended at 62 FR 51352, Sept. 30, 1997]

#### § 119.435 Integral fuel tanks.

(a) Diesel fuel tanks may not be built integral with the hull of a vessel unless the hull is made of steel or aluminum.

(b) During the initial inspection for certification of a vessel, integral fuel tanks must withstand a hydrostatic pressure test of 35 kPa (5 psig), or the maximum pressure head to which they may be subjected in service, whichever is greater. A standpipe of 3.5 meters (11.5 feet) in height attached to the tank may be filled with water to accomplish the 35 kPa (5 psig) test.

#### § 119.440 Independent fuel tanks.

(a) *Materials and construction.* Independent fuel tanks must be designed and constructed of materials in compliance with the requirements of this paragraph.

(1) The material used and the minimum thickness allowed must be as indicated in Table 119.440(a)(1), except that other materials which provide equivalent safety may be approved for use under paragraph (a)(3) of this section. Tanks having a capacity of more than 570 liters (150 gallons) must be designed to withstand the maximum head to which they may be subjected in service, but in no case may the thickness be less than that specified in Table 119.440(a)(1).

TABLE 119.440(a)(1)

Material	ASTM Specification (latest edition)	Thickness in millimeters (inches) & [gauge number] <sup>1</sup> vs. tank capacities for:		
		4 to 300 liter (1 to 80 gal) tanks	More than 300 liter (80 gal) and not more than 570 liter (150 gal) tanks	Over 570 liter (150 gal) <sup>2</sup> tanks
Nickel-copper.	B127, hot rolled sheet or plate.	0.94 (0.037) [USSG 20] <sup>3</sup> .....	1.27 (0.050) [USSG 18] .....	2.72 (0.107) [USSG 12]
Copper-nickel <sup>4</sup> .	B122, UNS alloy C71500.	1.14 (0.045) [AWG 17] .....	1.45 (0.057) [AWG 15] .....	3.25 (0.128) [AWG 8]
Copper <sup>4</sup> .....	B152, UNS alloy C11000.	1.45 (0.057) [AWG 15] .....	2.06 (0.081) [AWG 12] .....	4.62 (0.182) [AWG 5]
Copper-silicon <sup>4</sup> .	B97, alloys A, B, and C.	1.29 (0.051) [AWG 16] .....	1.63 (0.064) [AWG 14] .....	3.66 (0.144) [AWG 7]
Steel or iron <sup>5,6</sup> .	.....	1.90 (0.0747) [MSG 14] .....	2.66 (0.1046) [MSG 12] .....	4.55 (0.1793) [MSG 7]
Aluminum <sup>7</sup> ..	B209, alloy 5052, 5083, 5086.	6.35 (0.250) [USSG 3] .....	6.35 (0.250) [USSG 3] .....	6.35 (0.250) [USSG 3]
Fiber reinforced plastic.	.....	as required <sup>8</sup> .....	as required <sup>8</sup> .....	as required <sup>8</sup>

<sup>1</sup>The gauge numbers used in this table may be found in many standard engineering reference books. The letters "USSG" stand for "U.S. Standard Gauge," which was established by the act of March 3, 1892 (15 U.S.C. 206), for sheet and plate iron and steel. The letters "AWG" stand for "American Wire Gauge" (or Brown and Sharpe Gauge) for nonferrous sheet thicknesses. The letters "MSG" stand for "Manufacturers' Standard Gauge" for sheet steel thickness.

<sup>2</sup>Tanks over 1514 liters (400 gallons) shall be designed with a factor of safety of four on the ultimate strength of the material used with a design held of not less than 1220 millimeters (4 feet) of liquid above the top of the tank.

<sup>3</sup>Nickel-copper not less than 0.79 millimeter (0.031 inch) [USSG 22] may be used for tanks up to 114-liter (30-gallon) capacity.